

Fibre materials: Protection from hazardous fibre dusts

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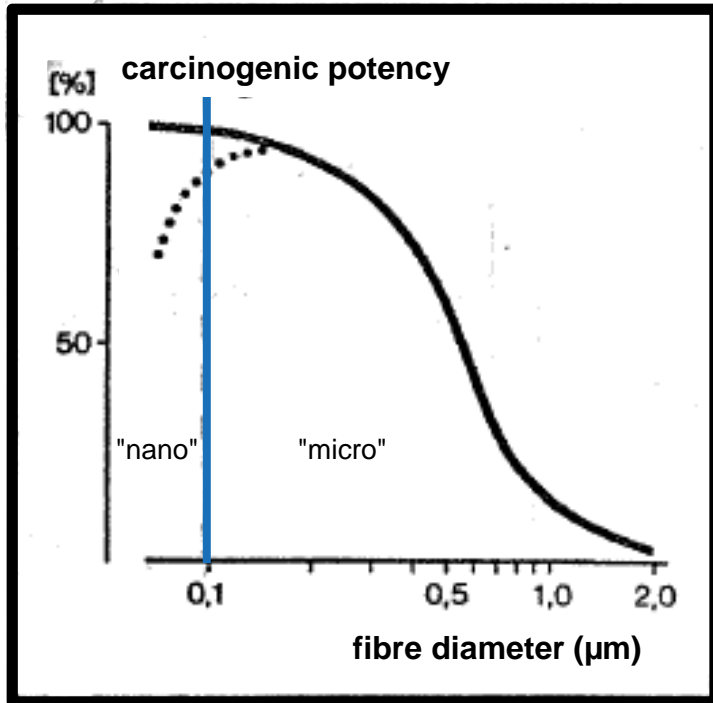
Department "Hazardous Substances and Biological Agents"

BAuA - Federal Institute for Occupational Safety and Health

Your Questions

- After the presentation you will have the opportunity to ask questions
- Questions can be asked via the chat or directly
- For further questions following the webinar, please contact: chemg@baua.bund.de

Starting point: fibre toxicity



Pott, F †- Arbeitsmedizin, Sozialmedizin, Prävention 8 (1977)

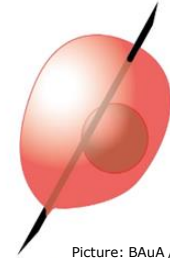
Fibre principle: Pott, Stanton (1972)

WHO fibres (DE, TRGS 905: "Faserstaub")

- **thin** ($< 3 \mu\text{m}$)
- **long** ($5 \mu\text{m} - \text{ca. } 100 \mu\text{m}$)
- **elongated** (length/diameter $> 3/1$)
- **biopersistent**

... can be released from

- **asbestos and other fibre materials**
- **man-made mineral fibres (MMMF)**
- **other fibrous and fibre-containing materials**



Picture: BAuA / Brandau-Pollack

Biopersistent rigid fibres pierce the macrophages in the lung, accumulate and can migrate into the abdominal and thoracic pleura. The late consequence can be cancer.

Preventing a second asbestos disaster



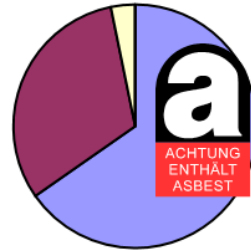
Notified occupational diseases

total: 84,853
agents*: 46,265
asbestos: 10,636



Recognised occupational diseases

total: 20,422
agents: 6,377
asbestos: 2,943



Deaths (recognised OD)

total: 2,581
agents: 2,530
asbestos: 1,707
(comp. traffic deaths: 3,059)

- The globally accepted "fibre principle" is not yet adequately incorporated into EU chemical safety regulations
- Materials are not always "substances" in a legal sense, the relation to chemicals regulation is often unclear.

* chemical and biological agents

Source: Safety and Health at Work - annual report for 2019, BAuA

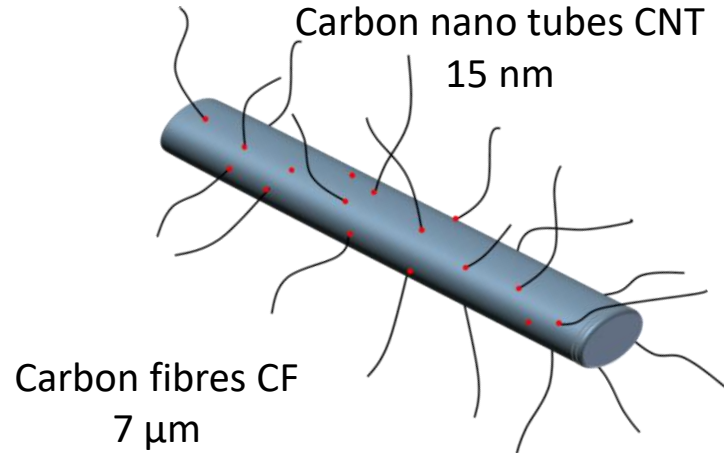
Fibres are the basis of many material innovations

Fibre composites

- optimisation of material properties
- combination of at least two materials

Reinforcing fibres

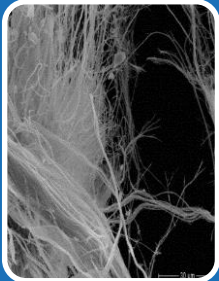
- **textile glass fibres**
- **carbon fibres**
- aramid fibres
- refractory ceramic fibres
-



Examples

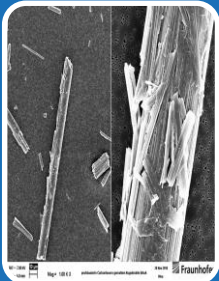
- **carbon fibre reinforced concrete**
- **decorative plasters containing PAN fibres**
- **conductive micro- and nanofibres**

Two cases of materials with possible potential to release fibre dust



1) materials (including composites) with a fibre diameter in the respirable range ($< 3 \mu\text{m}$)

- asbestos, erionite, ...
- man-made mineral fibres (MMMMF)
- whiskers
- carbon nano tubes
- ...



2) materials (including composites) with a fibre diameter clearly above the respirable range, but **respirable fibre dusts are released by splintering.**

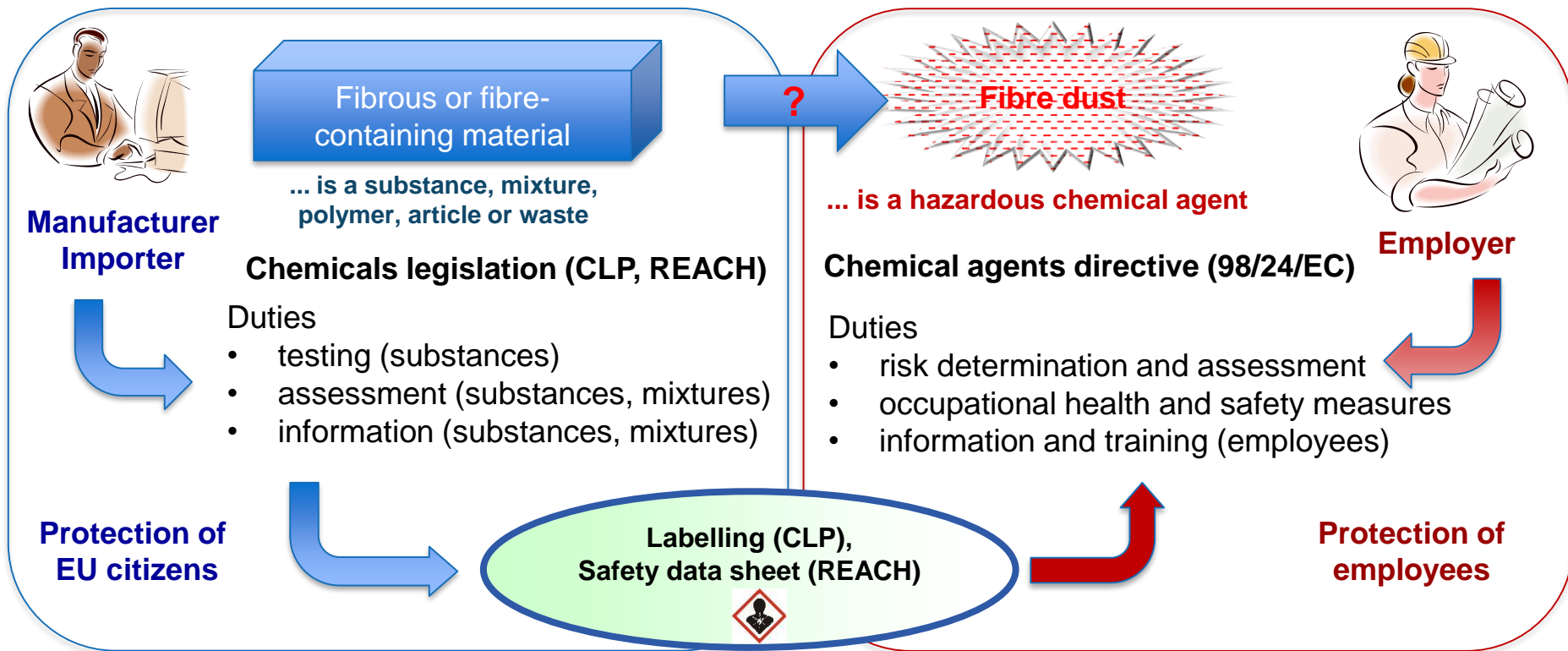
- p-aramide
- certain types of carbon fibres
- ...

pictures: BAuA / Fraunhofer ITEM

Data necessary for a fibre specific risk assessment

- **Exposure:** Potential for releasing fibre dusts through mechanical and chemical processes or physical conditions throughout the life cycle.
- **Hazard:** Biopersistence or carcinogenic potency of released fibre dusts.

Regulatory gap: insufficient risk information

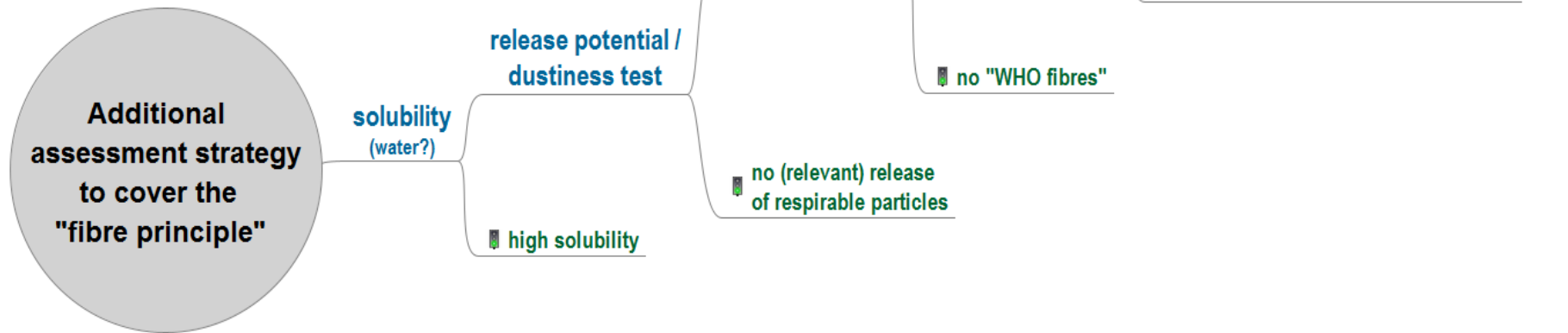


Information requirements

Substances (in fibreform)

(length $\geq 5 \mu\text{m}$, diameter $< 3 \mu\text{m}$ and aspect ratio $\geq 3:1$)

- **manufactured** as such or
- **released** from substances, mixtures or articles



Regulatory target

**Coherent integration
of the "fibre principle"
into EU chemicals regulation
taking into account the consequences
for other legal requirements
or frameworks
(e.g. OSH regulation)**

Scope of the public consultation / RMOA (I)

- **Consideration of nine pragmatically chosen “product groups”**
 - per group there are 1 - 2 "lead materials" with existing legal entries as a "substance" (CLP inventory, overview of REACH registered substances, harmonised classification)
 - the public consultation should establish references to other fibre materials
- **Focussed on the "fibre principle", i.e. carcinogenic hazard of fibre dusts after inhalation**
 - no specific consideration of "chemical hazards" from ingredients and contaminants
- **Determination of the characterization data necessary for the unambiguous identification of fibre materials relevant to regulation**
 - e.g. note R acc. to CLP-Reg. (Determination of an average fibre diameter for wool)
 - upper fibre diameter for consideration of relevant continuous / textile fibre materials
 - ...

Scope of the public consultation / RMOA (II)

Determination and provision of relevant data for the identification of deficits in information generation and transmission for adequate protection against fibre dusts

- characterization of the fibre materials
- manufacture and quantities
- uses
- products
- exposure
- risk reduction strategies
- prevention measures
- alternatives
- recycling und disposal

Objective → to determine the best possible option for a coherent regulation

Your questions please